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*Published in:*
Anaesthesia

*DOI:*
10.1111/anae.15253

*Publication date:*
2021

*Document Version*
Peer reviewed version

Article type : Review Article

**Guidelines**

# Airway management guidance for the endemic phase of COVID-19

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This guidance was commissioned by the Intensive Care Society, Faculty of Intensive Care Medicine, Association of Anaesthetists, Royal College of Anaesthetists and produced in collaboration with the Difficult Airway Society.

It is also published on the Anaesthesia - Intensive Care Medicine 'hub' website of the Association of Anaesthetists, Intensive Care Society, Faculty of Intensive Care Medicine, Royal College of Anaesthetists and has been approved by all four organisations.

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**Short title:** Airway guidance for the endemic phase of COVID-19

**Keywords:** airway; intubation; coronavirus; COVID-19; anaesthesia

**Summary**

It is now apparent that severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) and coronavirus disease 2019 (COVID-19) will remain endemic for some time. Improved therapeutics and a vaccine may shorten this period, but both are far from certain. Plans must be put in place on the assumption that the virus and its disease will continue to impact on the care of patients and the safety of staff. This will impact particularly on airway management due to the inherent risk to staff during such procedures. Research is needed to clarify the nature and risk of respiratory aerosol-generating procedures. Improved knowledge of the dynamics of SARS-CoV-2 infection and immunity is also required. In the meantime, we describe the current status of airway management during the endemic phase of the COVID-19 pandemic. Some controversies remain unresolved, but the safety of patients and staff remains paramount. Current evidence does not support or necessitate dramatic changes to choices for anaesthetic airway management. Theatre efficiency and training issues are a challenge that must be addressed, and new information may enable this.

Consensus airway guidelines from the Difficult Airway Society (DAS), Association of Anaesthetists, Intensive Care Society, Faculty of Intensive Care Medicine and Royal College of Anaesthetists (RCoA) were published in March 2020 [1] with paediatric guidance published in April [2]. These focus mainly on management of critically ill patients with confirmed or suspected coronavirus disease 2019 (COVID-19).

It is now apparent that severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) and COVID-19 will remain endemic for some time. Improved therapeutics and a vaccine may shorten this period, but both are far from certain. Plans must be put in place on the assumption that the virus and its disease will impact us and our patients. Present knowledge would suggest this will lead to:

- Increased, and likely fluctuating demands for COVID-19-related healthcare as the prevalence of the disease rises and falls episodically [3];
- Increased risk to patients of poorer peri-operative outcome if infected with SARS-CoV-2 [4];
- A risk to both patient and staff of cross-infection, made more complex by the potential for disease transmission while asymptomatic and the difficulty in reliably identifying infected patients.

These factors will affect all healthcare delivery. Here we consider the effects on airway management in anaesthetic practice.

**Aerosol-generating procedures and proportionate personal protective equipment**

Throughout June and early July 2020, the prevalence of SARS-CoV-2 in the UK decreased considerably [5]. There is debate as to whether current rules relating to personal protective equipment (PPE) use remain necessary, in particular in settings where patients have self-isolated and been screened for SARS-CoV-2 infection before elective surgery. A recent systematic review reported that no study to date has detected live SARS-CoV-2 virus secretion beyond day nine of illness despite persistently high viral load, which means a period of self-isolation of 14 days (encompassing a ≤5 day incubation period and ≤9 days of viral shedding) provides considerable reassurance [Cevik M et al., Unpublished data, doi.org/10.1101/2020.07.25.20162107]. However, there have also been local outbreaks of infection causing temporary closure of hospitals in the south-west [6] and south-east [7] of England and re-introduction of lockdown across whole cities [8]. Prevalence in the UK is currently higher than in many other countries. $R_0$ is close to or above 1 in some regions and decreases in prevalence, having plateaued, may now be increasing [9]. Recent changes in national guidance mean that patients presenting for planned surgery are unlikely to have self-isolated for more than 48–72 h [10].

The evidence around which airway procedures are, or are not, aerosol-generating procedures (perhaps better termed aerosol-generating medical procedures), and the associated risk of infection to those involved, is an area in need of urgent, definitive research. At present we are reliant on syntheses of limited evidence and resultant national advice. Public health bodies in England, Northern Ireland, Scotland and Wales released an updated list of aerosol-generating procedures in early June 2020 [11], but there are no changes regarding airway management: face mask ventilation, tracheal intubation and extubation remain designated as aerosol-generating procedures and there is no guidance about supraglottic airway (SGA) use. The intubateCOVID study [12] reported that approximately 10% of those involved in tracheal intubation of patients with confirmed or suspected COVID-19 subsequently developed symptoms consistent with SAR-CoV-2 infection or a positive antigen test, despite the vast majority of involved staff wearing airborne protection PPE [13]. However, whether performing these procedures and subsequent evidence of infection is an association or is linked causally remains uncertain.

The Association of Anaesthetists and the RCoA via the Anaesthesia-Intensive Care Medicine hub website have provided guidance on PPE use for airway management in general [14]; in obstetric anaesthesia care [15]; and during paediatric anaesthesia [2]. This guidance remains in place but has been supplemented by additional guidance on maintaining staff safety while trying to improve theatre efficiency [16]. Professional guidance has also been issued on appropriate aerosol clearance times to be adhered to after aerosol-generating procedures, and particularly after airway management at the beginning and end of general anaesthesia [17]. Adherence to the appropriate number of aerosol clearance times – most likely five aerosol clearance times before staff enter the room after each aerosol-generating procedure – will

promote both staff safety and theatre efficiency. This fallow time is not necessary before the patient or staff may leave the room [16].

If the prevalence of SARS-CoV-2 in the community and hospitals continues to decrease, guidance will need to be updated. Decisions to modify precautions, such as using anaesthetic rooms and altering or stopping the use of PPE, are complex due to the dynamic and uncertain nature of the situation. Any decision to stop using PPE, initially selectively and then in general, should be led by national and local decision-making, and guidance on this process has been issued [18]. Airborne precaution PPE is indicated for an aerosol-generating procedure and it is not logical to use droplet precaution PPE for protection against aerosols, as this protects against the wrong mode of disease transmission [13].

**Choices in airway management**

Fundamentals of airway management have not changed as a result of COVID-19 but there is perhaps now, even more than previously, a focus on use of personnel, equipment and techniques that achieve successful and safe airway management at the first attempt.

When regional anaesthesia is appropriate, avoidance of general anaesthesia obviates the need for airway aerosol-generating procedures and may decrease risk to staff while improving theatre efficiency [19]. Informed patient consent will, as usual, require an open discussion and explanation of benefits and risks for patient and staff [20].

There is a lack of clear evidence regarding the degree of risk to staff of exposure to aerosolised virus during airway management with a tracheal tube or a SGA, and whether these differ. In the absence of such evidence it remains a clinical judgement whether a tracheal tube or SGA is used, but COVID-19 should not be a major driver to change routine practice.

**Airway assessment**

Since the COVID-19 outbreak, face-to-face consultations have been actively discouraged and many interactions are now virtual. This has the potential to impact on the opportunities for, and accuracy of, airway assessment, in particular of patients in whom airway difficulty is an increased risk. It is too early to know whether this will impact on the number of unexpected difficulties encountered during airway management. As a result of the emphasis on limiting the number and duration of aerosol-generating procedures, airway assessment should not be limited to identification of potential difficulty with laryngoscopy, and particular attention should be paid to identifying factors that may decrease safe apnoea time or predict difficulty in facemask ventilation. Optimising the quality of remote airway assessment and exploring whether it correlates with face-to-face assessment is an area worthy of research.

**Pre-oxygenation and per-oxygenation – extending safe apnoea time**

Prolonging safe apnoea time is a mainstay of safe airway management but in the COVID-19 setting may also reduce the need for facemask ventilation and other aerosol-generating procedures. Measures to prolong safe apnoea time are advisable in all patients before general anaesthesia but particularly in those patients in whom either difficult airway management or a short safe apnoea time is predicted.

Meticulously applied, standard pre-oxygenation methods are suitable for most patients. The threshold for use of low-flow nasal oxygen during airway management should be lowered as this may effectively delay oxygen desaturation and obviate the need for other interventions [21].

High-flow humidified nasal oxygen remains on the UK public health organisations list of aerosol-generating procedures [11] but the evidence base for this is not conclusive and its inclusion is likely precautionary [22]. Use of high-flow nasal oxygen should be considered relatively rather than absolutely contraindicated. Where a patient's risk of hypoxaemia during anaesthetic care is significant, and rapid arterial oxygen desaturation would necessitate other, perhaps riskier, aerosol-generating procedures, an individual risk-benefit assessment may favour the use of high-flow nasal oxygen. If high-flow nasal oxygen is used, airborne precaution PPE should be worn.

**Facemask ventilation**

Facemask ventilation is currently considered to be an aerosol-generating procedure. The extent of aerosol generation will logically depend on factors that include the extent of (poor) airway seal; the peak airway pressure; duration of facemask ventilation; and any episodes of mask removal. Assessment of all patients is important to identify and plan for those in whom facemask ventilation may be difficult, as difficult facemask ventilation is likely to be associated with increased airway leak.

When facemask ventilation is used, a technique that minimises risk of leak should be adopted. This includes optimal airway positioning (sniffing or 'flextension' [23]) and airway manoeuvres (chin lift and jaw thrust), adequate anaesthesia and early use of an oropharyngeal airway. Capnography during facemask ventilation is useful in assessing adequacy of ventilation and airway leak [24]: when the airway is clear and sealed, facemask ventilation should produce a capnogram with normal shape and a plateau. Loss of the plateau and reduction in detected exhaled carbon dioxide progressively indicates worsening ventilation from airway leak or obstruction. There should be early recourse to optimising manoeuvres: handing over to a more experienced clinician; repositioning; use of a 'VE hand' position ('vice grip' [23]); use of a two-person or three-person technique; neuromuscular blockade; and early recourse to a SGA may each be useful.

**Videolaryngoscopy in routine practice**

Consensus UK COVID-19 airway management guidelines advocate videolaryngoscopy as the default technique for tracheal intubation [1]. Early data from the intubateCOVID study indicate this has been widely used and first-pass success rates were high in challenging situations [12]. The reasons to use videolaryngoscopy in a COVID-19 setting have not changed and include (compared with direct laryngoscopy) improved view at laryngoscopy; reduced likelihood of difficult or failed intubation; improved first-pass success; and increased distance between the intubator and patient [25,26]. Despite a likely increase in access to videolaryngoscopy, as anaesthetic and surgical activity increases it may be that some will not have capacity for universal use of videolaryngoscopy and some may choose not to use it.

**Supraglottic airways**

Guidance has been published on the Anaesthesia-Intensive Care Medicine hub website about use of SGAs in the COVID-19 setting [27] and this is also discussed in guidance on optimising operating theatre processes [16]. There remains uncertainly as to whether insertion, removal or ventilation via a SGA generates aerosols. It is anticipated that research will soon shed light on this. A Scottish review of aerosol-generating procedures (on which evidence the UK public health organisations have updated the core aerosol-generating procedure list) concluded that there was no evidence that SGA insertion is an aerosol-generating procedure, but conversely presented no evidence that it is not [28].

We summarise our consensus view at present, which may be updated in the event of new evidence (Fig. 1).

- The act of inserting or carefully removing a SGA is unlikely to create aerosols. However, other necessary procedures (facemask ventilation; airway suction; reverting to tracheal intubation) or patient actions (coughing) may generate aerosols and these occur unpredictably during SGA insertion and removal. Therefore, SGA insertion and removal should be planned for as if it were an aerosol-generating procedure. Coughing during removal of a SGA is less common than for a tracheal tube [29,30].
- If none of the above associated events occurs, SGA insertion and removal may be treated as not being an aerosol-generating procedure (but only after the event). This may improve theatre efficiency by reducing delays dependent on others' use of PPE and waiting for five aerosol clearance times to elapse before others enter the theatre.
- Use of a SGA when there is a good airway seal during maintenance will logically be no more likely to create an aerosol than would ventilation via a tracheal tube. However, if there is a leak, there may be potential to generate aerosols. It should usually be evident at or soon after insertion whether a good airway seal has been achieved. Capnography and anaesthetic machine spirometry loops can be particularly useful in identifying leaks.
- Whether an airway seals well with the SGA depends on multiple factors:

- Patient: size; shape; airway anatomy; lung and chest wall compliance; position during surgery.
- Device: design (most second-generation SGAs perform better than most first-generation devices [31]); correct sizing.
- Mode of ventilation: airway leak is less likely during spontaneous ventilation, but patient movement or coughing during light anaesthesia increases risk of leak; during controlled ventilation, lower peak airway pressures minimise leak.
- Anaesthetist: knowledge; experience; technique; performance.
- Surgery: need for access to the airway or head and neck; patient position or surgical procedures that alter lung compliance.
- Other factors: neuromuscular blockade is unlikely to improve airway seal routinely but may help in some cases [32].

**Awake tracheal intubation**

Awake tracheal intubation techniques were likely used less frequently during the pandemic surge. As more routine surgical activity is undertaken, the number of cases for which it is now indicated will increase. This particularly includes head and neck cancer surgery, where delayed presentations and challenging airways may be more common as a result of the pandemic. The indications for awake tracheal intubation are generally the same with or without COVID-19, and avoiding awake techniques in such patients in order to protect staff may put patients at risk.

Local anaesthesia and sedation techniques that minimise coughing are recommended. These include nebulised local anaesthesia before arriving in theatre; using antitussive agents such as remifentanil before topicalisation; slow and precise topicalisation with adequate time between sprays; maintaining appropriate distancing from the patient; and avoidance of cough-generating techniques such as administering intratracheal local anaesthesia. Due to the proximity between intubator and the patient and the potential for coughing, awake tracheal intubation should be considered an aerosol-generating procedure.

Because of the difficulty in cleaning the working channels of flexible optical bronchoscopes, single-use devices have potential benefits and are recommended provided the device's quality is sufficient and broadly similar to an available reusable device.

**Use of innovative equipment**

As "*necessity is the mother of invention"*, the challenges posed by the pandemic have led to several innovations designed to reduce the risk of operator exposure to viral aerosols during airway manoeuvres – particularly during tracheal intubation.

The most obvious example of this in adult practice has been a clear Perspex® 'aerosol box' [33] (of which there are numerous variations) designed to prevent dispersal of virus-containing droplets and aerosols. Other examples are use of plastic isolating sheets or enclosures over the face, especially of children during tracheal intubation, and the use of suction or extractor hoods placed close to the patient's airway [34-7]. These have been prominent on social media, but the extent of clinical use is unknown. In the case of the aerosol box, one evaluation [38] has shown it to hinder the tracheal intubation process; reduce tracheal intubation success; and risk or cause damage to PPE. A second study suggested its potential to increase exposure to exhaled particles [36] and a third suggested failure of the box to contain the aerosol [39].

It is likely that some innovative practices may provide benefit. However, there is also the potential for harm, some of which may be from unintended consequences. The principles of airway management promoted in the consensus UK COVID-19 airway management guidelines are *safe, accurate and swift* (SAS) airway management [1]. Accuracy refers to use of techniques and equipment that has been evaluated and shown to be effective and reliable, enabling first time success. The use of innovations that have not been evaluated goes against these SAS principles. It may also have legal implications if there is harm to patients or staff. While we support innovation, we do not support use of unevaluated innovations [40].

**Paediatric considerations**

The incidence of COVID-19 in children requiring hospitalisation in the UK remains very low, with only a small number requiring intensive care admission and very low mortality in children [41,42]. A small number have been affected by the rare paediatric multisystem inflammatory syndrome, temporally associated with COVID-19 [43]. Consensus guidelines for managing the airway in children with COVID-19 remain unchanged from those published in April 2020 [2].

During the pandemic, suspension of most elective surgical work has had significant repercussions in paediatric surgery and anaesthesia. Many district general hospitals diverted their paediatric emergencies to tertiary centres. It is likely that this surgery will soon be repatriated and that elective paediatric surgery will recommence.

The Royal College of Paediatrics and Child Health has recently published guidance on elective surgery in children [44]. This proposes use of local prevalence data to drive pre-operative management, with this categorised as red (prevalence rate > 2%); amber (≥ 0.5% and < 2%); or green (< 0.5%). During amber and green periods the guidance concludes that (disruptive and often poorly complied with) child and family isolation will provide little benefit and recommends that pre-operative isolation of children and their parents is not required. Changes in national or local activity will trigger altered peri-operative processes. One challenge in implementing this guidance is knowledge of local prevalence.

Management of attending parents and carers differs little from normal. A parent or carer who is asymptomatic can be present at induction and should leave before any aerosol-generating procedure. The parent or carer should wear a face covering or droplet protection PPE in theatre.

**Obstetric anaesthesia**

The unpredictable timing of childbirth makes it a major challenge to identify and separate obstetric patients into cohorts of higher and lower risk of SARS-CoV-2 infection, although this may be possible for planned procedures. Better testing procedures, including more rapid turnover and greater reliability of results, may improve the situation, but it is likely that precautions against SARS-CoV-2 transmission will need to remain longer in obstetric settings than others. Recommendations for obstetric anaesthesia care for patients with COVID-19 have been published elsewhere [45].

Part of good obstetric care in normal circumstance involves avoiding general anaesthesia when possible, and this is likely particularly true in the COVID-19 setting. Measures to achieve this include:

- Good communication and planning between anaesthetist, patient, midwives and the obstetric team, including the management of suboptimal regional anaesthesia;
- Informing women with symptomatic or confirmed COVID-19 [46] who are in early labour about the potential benefit of epidural analgesia in minimising the need for general anaesthesia if urgent intervention for birth is needed so that they can make informed decisions regarding use or type of labour analgesia and anaesthesia;
- Optimal fetal resuscitation in cases of fetal distress.

The remote location of many delivery suites, the frequently urgent nature of care and the high cognitive demands create challenging circumstances when delivering general anaesthesia for a pregnant woman suspected or known to be SARS-CoV-2 infected. Help from a senior anaesthetist, particularly out of hours, may be delayed due to remote location and the need to don PPE. Some departments advocate having two anaesthetists available for COVID-19 positive cases. There should always be clear lines of communication about who to call and how to contact them [47].

General anaesthesia and rapid sequence induction should follow the principles in the consensus UK COVID-19 airway management guidelines [1]. The checklist within these guidelines was designed to be adaptable to local need and an example of adaptation for obstetric rapid sequence induction is shown in Figure 2. Use of such a checklist may be suitable for planned obstetric interventions but is too detailed for category 1 caesarean section: many of the preparatory actions in columns 1 and 2 therefore require structured

organisation to ensure readiness for such cases. In the event of a failed intubation, the decision to proceed with surgery or awaken the mother should follow the 2015 Obstetric Anaesthetists' Association and DAS obstetric intubation guidelines [48].

**Patients with a tracheostomy**

Performance of tracheostomy and open tracheal suction (e.g. via a tracheostomy) are included in mainstream lists of aerosol-generating procedures. Tracheostomy tube care, cuff care and tube changes all also have the potential for aerosol generation. There is therefore a need for clear protocols when undertaking tracheostomy formation, anaesthetising a patient with a tracheostomy or managing tracheostomies on the wards.

During the COVID-19 pandemic it is likely that a greater proportion of tracheostomies in the critically ill will be performed in theatres using an open surgical technique. Use of a cuffed non-fenestrated tracheostomy tube is recommended. Guidance has been issued on the timing and management of tracheostomy formation in this setting [49]. ENT-UK, collaborating with other organisations, has published a framework for open tracheostomy in COVID-19 patients [50]. This guidance emphasises the importance of collaboration between anaesthetist and surgeon when the trachea is open during tracheostomy and while exchanging the orotracheal tube for a tracheostomy tube. Pre-oxygenating, advancing the tracheal tube beyond the surgical site and stopping ventilation during the open tracheal and tube exchange phases are all strategies to reduce aerosol generation in the surgical field.

An extensive range of COVID-19 tracheostomy resources is available at the National Tracheostomy Safety Project website (http://www.tracheostomy.org.uk/healthcare-staff/improving-tracheostomy-care/covid-19) including professional multidisciplinary guidance for adult and paediatric practice and information for patients and carers.

**Training in airway management – guidance for novice airway training**

In the UK each year more than 1000 trainees undertake training in anaesthesia and are required to complete an 'initial assessment of competence'. Of these, approximately 600 come through training paths that lead to continuing anaesthetic training. The remainder will exit to emergency medicine (around 360 per year) or acute medicine training pathways. Similar training pressures will exist outside the UK.

The knowledge and skills required to complete the UK initial assessment of competence are outlined in the 2010 Anaesthetic Curriculum annex B [51] and require the acquisition of skills in airway management that include:

• Maintaining the airway with oral/nasopharyngeal airways;
• Ventilating the lungs with a bag and mask;
• Inserting and confirming placement of a SGA;
• Successfully placing nasal/oral tracheal tubes using direct laryngoscopy;
• Correctly conducting rapid sequence induction.

The trainee must be assessed as competent in these skills as part of the initial assessment of competence before undertaking general anaesthesia without direct supervision. All training required to complete the initial assessment of competence is undertaken in a supernumerary capacity, which places considerable demands on anaesthetic departments.

Several factors have had a detrimental impact on departments' ability to undertake novice training during the COVID-19 pandemic. The consensus UK COVID-19 airway management guidelines advocate videolaryngoscopy as a default intubation technique [1], and this has been widely adopted. These guidelines also advocate airway management being undertaken by the most senior anaesthetist. Finally, the volume of elective NHS surgical activity has decreased considerably, and some of this is now being undertaken in non-NHS hospitals.

There is therefore a risk that doctors in training in the coming year will be unable to gain sufficient clinical experience to develop the skills required for successful completion of the initial assessment of competence. This is particularly important for those groups of trainees who will spend only a few months in an anaesthetic attachment. In the UK, successful completion of the initial assessment of competence is a mandatory requirement for this group and failure to achieve it within their anaesthetic placements will necessitate additional training time and further impact on training capacity in the future.

*Measures to support training*

The RCoA and DAS have worked in partnership to produce this guidance to support both trainees and trainers in the training period before the initial assessment of competence. Some departments will already have made plans locally to address the issue of increased pressure on new start trainee airway training. The following measures are essential to support skills-development in the current climate.

- Simulation should be used to augment clinical experience and promote airway skills acquisition.
- Clinical schedules should be adapted specifically to enable delivery of both in-theatre training and simulation to those doctors in training who need to complete the initial assessment of competence.
- Appropriate training facilities should be established, both in terms of physical space and equipment, to support the regular use of simulation as an adjunct to clinical practice.

- Videolaryngoscopy can be used as an alternative to direct laryngoscopy for training and assessment in tracheal intubation in clinical settings. However, all trainees must be able to demonstrate competence in direct laryngoscopy in simulated settings to successfully complete the initial assessment of competence.

All departments must have a comprehensive plan to ensure that airway training can be optimised in the coming year to ensure successful completion of the initial assessment of competence. This should be agreed with the College Tutor and departmental Airway Lead. A teaching package from DAS and the RCoA for the delivery of simulation airway training to novice trainees in preparation for the initial assessment of competence is available on the DAS website [52].

**Conclusions**

The pandemic has entered a phase of endemic infection and the consequences of this will impact healthcare for a significant period. This creates a dynamic situation during which both the course of the pandemic and the success of global responses to it are uncertain. Research is needed to clarify the nature and risk to staff of aerosol-generating procedures. Improved knowledge of the dynamics of SARS-CoV-2 infection and immunity to it are required. In the meantime, this document outlines the current status of airway management within the COVID-19 pandemic. Some controversies remain unresolved, but the safety of patients and staff remains paramount. Current evidence does not support or necessitate dramatic changes to choices for anaesthetic airway management. Theatre efficiency and training issues are a challenge that must be addressed to enable efficient delivery of healthcare, and new information may enable this. A collaborative approach between the relevant anaesthetic bodies remains an important way to maintain and enhance standards in airway management.

**Acknowledgements**

TC's department has received free or at cost airway equipment from numerous airway device manufacturers for evaluation or research. He has spoken at educational events organised by Covidien, Storz GmBh and Fisher and Paykel but has not been paid for any of these. No funding or other competing interests declared.

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**Figures**

**Figure 1.** Aerosol generation during supraglottic airway (SGA) use: risk factors and considerations.
AGP, aerosol-generating procedure.

**Figure 2.** An example of a checklist suitable for use before a planned rapid sequence induction for a pregnant patient with or suspected to have coronavirus disease 2019 (COVID-19). Adapted from the original consensus UK COVID-19 airway management guidelines [1].
RSI, rapid sequence induction; PPE, personal protective equipment; FFP, filtering facepiece; eFONA, emergency front-of-neck airway; HME, heat and moisture exchanger; SGA, supraglottic airway; OAA, Obstetric Anaesthetists Association; $SpO_2$, pulse oximetry; ECG, electrocardiogram; iv, intravenous; $ETO_2$, end-tidal oxygen; NIV, non-invasive ventilation; HFNO, high-flow nasal oxygen; CTG, cardiotocograph; GA, general anaesthesia; NMJ, neuromuscular junction.

| SGA PROCEDURE | RISK FACTORS AND CONSIDERATIONS | AEROSOL-GENERATION |
|---|---|---|
| **Insertion** | • Facemask ventilation<br>• Airway suction<br>• Multiple attempts<br>• Change to tracheal intubation | **AGP if risk factor occurs** |
| | | **Low risk if none occur** |
| **Maintenance** | • Patient features<br>• Device used<br>• Mode of ventilation<br>• Anaesthetist<br>• Surgery<br>• Neuromuscular blocking drugs | **Low risk unless airway leak present** |
| **Removal** | • Facemask ventilation<br>• Suction<br>• Revert to tracheal intubation<br>• Coughing | **AGP if risk factor occurs** |
| | | **Low-risk if none occur** |

# Tracheal intubation checklist COVID-19
## Obstetric RSI version

Personal Protective Equipment | Prepare Equipment | Prepare for Difficulty | In the Room | Post-procedure and Safety

## OUTSIDE ROOM

PPE – be thorough, don't rush
- ❑ Wash hands
- ❑ Buddy with checklist
- ❑ Put on PPE
  - ❑ Long sleeved gown
  - ❑ FFP3 (or equivalent) mask
  - ❑ Gloves
  - ❑ Eyewear
  - ❑ Headwear and wipeable shoes as per local protocol
- ❑ Final buddy check
- ❑ Names on visors

❑ Allocate roles:
- **A:** Team leader and intubator
- **B:** Cricoid force and intubator's assistant
- **C:** Drugs, monitor, timer
- **D:** Runner (outside)

Decide who will do eFONA

❑ How does runner contact further help if required?

❑ Check kit (kit dump)
- ❑ Anaesthetic circuit **with HME attached**
- ❑ Catheter mount
- ❑ Guedel airways
- ❑ Working suction
- ❑ Videolaryngoscope
- ❑ Bougie/stylet
- ❑ Tracheal tubes x2
- ❑ Ties and syringe
- ❑ In-line suction ready
- ❑ Tube clamp
- ❑ 2nd generation SGA
- ❑ eFONA set available

❑ Do you have all the drugs required?
- ❑ Induction drug, with 2nd syringe ready
- ❑ Propofol 2–4 $mg.kg^{-1}$
- ❑ Neuromuscular blocking drug
- ❑ Opioid
- ❑ Full vaporiser
- ❑ Vasopressor
- ❑ Reversal agent
- ❑ Antibiotic

❑ Weight?

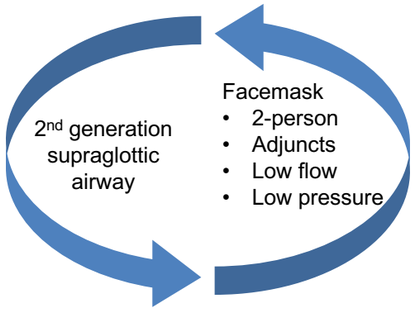
❑ Allergies?

❑ If the airway is difficult, should we wake the patient up? Use OAA decision chart

❑ VERBALISE the plan for a difficult intubation?

**Plan A:** RSI

**Plan B/C:** 2-handed 2-person mask ventilation & 2nd generation SGA




**Plan D:** Front of neck airway: scalpel bougie tube

❑ Extubation plan
❑ Confirm agreed plan

❑ Does anyone have any concerns?

## INSIDE ROOM

❑ Airway assessment
- ❑ Is airway difficulty anticipated? If so call for help
- ❑ Identify cricothyroid membrane

❑ Apply monitors
- ❑ Waveform capnography
- ❑ $SpO_2$
- ❑ ECG
- ❑ Blood pressure

❑ Checked IV access
❑ Antacid given

❑ Optimise position
- ❑ Consider ramping or reverse Trendelenburg
- ❑ Left bed tilt

❑ Optimal pre-oxygenation
- ❑ ≥ 3 min or $ETO_2$ > 85%
- ❑ Consider low-flow (5 $l.min^{-1}$) $O_2$ for apnoeic oxygenation (No NIV, no HFNO)

❑ Assistant ready to apply cricoid force?

❑ Before starting
- ❑ Review CTG
- ❑ Confirm GA still indicated

❑ Now proceed

## AFTER AND LEAVING

❑ Airway management
- ❑ Inflate cuff before any ventilating
- ❑ Check waveform capnography
- ❑ Push/twist connections
- ❑ Clamp tracheal tube before any disconnection
- ❑ Avoid unnecessary disconnections

❑ Extubation
- ❑ Prepare, plan, position
- ❑ NMJ function monitored
- ❑ Fully reversed
- ❑ Minimise noise
- ❑ Minimise aerosol generation

❑ Careful equipment disposal

❑ Decontamination of reusable equipment
❑ Complete and display intubation form

❑ Remove PPE
- ❑ Observed by buddy
- ❑ Use checklist
- ❑ Meticulous disposal
- ❑ Wash hands

❑ Clean room after 5 aerosol clearance times.